APPENDIX A - CLAIM AMENDMENTS

Serial No.: 09/622,089
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1. (Currently Amended) A reactor system, comprising a multi-partitioned fluidized bed reactor of a bubbling bed type configured to perform a reaction for treating ore fines while fluidizing raw material fines fed from one side surface of the reactor by a reaction gas injected from a plurality of gas injecting nozzles provided on a gas distributor placed on a lower portion in the reactor, thereby discharging a product from the other side surface of the reactor, wherein a fluidized bed is partitioned into a plurality of compartments by partition plates, a connecting hole for moving the raw material fines without causing back mixing by a difference in a fluidized bed height from an upstream side compartment to a downstream side compartment is provided in the lower part of the partition plate, and an average moving speed of the raw material fines passing through the connecting hole is 500 mm/second or less, the multi-partitioned fluidized bed reactor meeting conditions that:

a vertical position of the connecting hole has a height which is 1/4 of the fluidized bed height or less;

a length of the connecting hole is 100 mm or more;

wherein the plurality of gas injecting nozzles include a vertical gas injecting nozzle that is configured to inject a gas upward in a substantially vertical direction, a distance between an inlet of the connecting hole and an end surface of an upstream side of said vertical nozzle is greater than 150 mm and a distance between an outlet of the connecting hole and an end surface of a downstream side of said vertical nozzle is greater than 50 mm; and

an angle formed by a line connecting a corner portion of an upper surface of the connecting hole and a gas injecting port with respect to a horizontal plane is greater than an angle of repose of the raw material fines in any of openings on upstream and downstream sides of the connecting hole.

2. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 1 wherein a lower surface of the connecting hole is positioned above a gas injecting portion of the plurality of gas injecting nozzles.

3. (Original) The multi-partitioned fluidized bed reactor of Claim 1 or 2 wherein a diameter of the opening on the upstream side of the connecting hole is gradually reduced toward the downstream side.

4. (Original) The multi-partitioned fluidized bed reactor of Claim 1 or 2 wherein a lower surface portion of the opening on the upstream side of the connecting hole protrudes from an end surface of the partition plate toward the upstream side.

5. (Original) The multi-partitioned fluidized bed reactor of Claim 4 wherein a corner portion of an upper surface of a protruding portion is obliquely cut.

6. (Original) The multi-partitioned fluidized bed reactor of Claim 4 wherein an upper surface of a protruding portion is slanted downward from the upstream side toward the downstream side.

7. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 1 or 2 wherein the connecting hole is slanted downward from the upstream side toward the downstream side.

8. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 6 wherein an angle of slant is greater than an angle of repose of the raw material fines.

9. (Original) The multi-partitioned fluidized bed reactor of Claim 1 wherein a lower surface portion of the opening on the downstream side of the connecting hole protrudes from an end surface of the partition plate toward the downstream side.

10. (Original) The multi-partitioned fluidized bed reactor of Claim 9 wherein a corner portion of an upper surface of a protruding portion is obliquely cut.

11. (Original) The multi-partitioned fluidized bed reactor of Claim 1 wherein the connecting hole protrudes from both end surfaces of the partition plate on the upstream and downstream sides.

12. (Original) The multi-partitioned fluidized bed reactor of Claim 1 wherein one or more gas injecting nozzles are provided in a middle portion of the connecting hole, and a reaction gas is injected from the gas injecting nozzle into the connecting hole.

13. (Original) The multi-partitioned fluidized bed reactor of Claim 12 wherein a porous material is used as a tip of the gas injecting nozzle.

14. (Original) The multi-partitioned fluidized bed reactor of Claim 12 wherein a tip of the gas injecting nozzle is obliquely bent from the upstream side toward the downstream side.

15. (Previously Presented) The multi-partitioned fluidized bed reactor of claim 3, wherein the connecting hole is slanted downward from the upstream side toward the downstream side.

16. (Previously Presented) The multi-partitioned fluidized bed reactor of claim 7, wherein an angle of slant is greater than an angle of repose of the raw material fines.

17. (Currently Amended) A reactor system, comprising a multi-partitioned fluidized bed reactor of a bubbling bed type configured to perform a reaction for treating ore fines while fluidizing raw material fines fed from one side surface of the reactor by a reaction gas injected from a plurality of gas injecting nozzles provided on a gas distributor placed on a lower portion in the reactor, thereby discharging a product from the other side surface of the reactor, wherein a fluidized bed is partitioned into a plurality of compartments by partition plates, a connecting hole for moving the raw material fines without causing back mixing by a difference in a fluidized bed height from an upstream side compartment to a downstream side compartment is provided in the lower part of the partition plate, and an average moving speed of the raw material fines passing through the connecting hole is 500 mm/second or less, the multi-partitioned fluidized bed reactor meeting conditions that:

a vertical position of the connecting hole has a height which is 1/4 of the fluidized bed height or less;

a length of the connecting hole is 100 mm or more;

wherein the plurality of gas injecting nozzles include a horizontal gas injecting nozzle that is configured to inject a gas in a substantially horizontal direction, the distance between the inlet of the connecting hole and the end surface of the upstream side of the horizontal nozzle is greater than 200 mm and the distance between the outlet of the connecting hole and the end surface of the downstream side of the horizontal nozzle is greater than 100 mm; and

an angle formed by a line connecting a corner portion of an upper surface of the connecting hole and a gas injecting port with respect to a horizontal plane is greater than an angle of repose of the raw material fines in any of openings on upstream and downstream sides of the connecting hole.

18. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 17 wherein a lower surface of the connecting hole is positioned above a gas injecting portion of the plurality of gas injecting nozzles.

19. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 17 or 18 wherein a diameter of the opening on the upstream side of the connecting hole is gradually reduced toward the downstream side.

20. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 17 or 18 wherein a lower surface portion of the opening on the upstream side of the connecting hole protrudes from an end surface of the partition plate toward the upstream side.

21. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 20 wherein a corner portion of an upper surface of a protruding portion is obliquely cut.

22. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 20 wherein an upper surface of a protruding portion is slanted downward from the upstream side toward the downstream side.

23. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 17 or 18 wherein the connecting hole is slanted downward from the upstream side toward the downstream side.

24. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 22 wherein an angle of slant is greater than an angle of repose of the raw material fines.

25. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 17 wherein a lower surface portion of the opening on the downstream side of the connecting hole protrudes from an end surface of the partition plate toward the downstream side.

26. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 25 wherein a corner portion of an upper surface of a protruding portion is obliquely cut.

27. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 17 wherein the connecting hole protrudes from both end surfaces of the partition plate on the upstream and downstream sides.

28. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 17 wherein one or more gas injecting nozzles are provided in a middle portion of the connecting hole, and a reaction gas is injected from the gas injecting nozzle into the connecting hole.

29. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 28 wherein a porous material is used as a tip of the gas injecting nozzle.

30. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 28 wherein a tip of the gas injecting nozzle is obliquely bent from the upstream side toward the downstream side.

31. (Previously Presented) The multi-partitioned fluidized bed reactor of claim 19, wherein the connecting hole is slanted downward from the upstream side toward the downstream side.

32. (Previously Presented) The multi-partitioned fluidized bed reactor of claim 23, wherein an angle of slant is greater than an angle of repose of the raw material fines.

33. (Currently Amended) A reactor system, comprising a multi-partitioned fluidized bed reactor of a bubbling bed type configured to perform a reaction for treating ore fines while fluidizing raw material fines fed from one side surface of the reactor by a reaction gas injected from a plurality of gas injecting nozzles provided on a gas distributor placed on a lower portion in the reactor, thereby discharging a product from the other side surface of the reactor, wherein a fluidized bed is partitioned into a plurality of compartments by partition plates, a connecting hole for moving the raw material fines by a difference in a fluidized bed height from an upstream side compartment to a downstream side compartment is provided in the lower part of the partition plate, and an average moving speed of the raw material fines without causing back mixing passing through the connecting hole is 500 mm/second or less, the multi-partitioned fluidized bed reactor meeting conditions that:

a vertical position of the connecting hole has a height which is 1/4 of the fluidized bed height or less;

a length of the connecting hole is 100 mm or more;

wherein the plurality of gas injecting nozzles include an oblique gas injecting nozzle that is configured to inject a gas obliquely downward, the distance between the inlet of the connecting hole and the end surface of the upstream side of said oblique nozzle is greater than 200 mm and the distance between the outlet of the connecting hole and the end surface of the downstream side of said oblique nozzle is greater than 100 mm; and

an angle formed by a line connecting a corner portion of an upper surface of the connecting hole and a gas injecting port with respect to a horizontal plane is greater than an angle of repose of the raw material fines in any of openings on upstream and downstream sides of the connecting hole.

34. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 33 wherein a lower surface of the connecting hole is positioned above a gas injecting portion of the plurality of gas injecting nozzles.

35. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 33 or 34 wherein a diameter of the opening on the upstream side of the connecting hole is gradually reduced toward the downstream side.

36. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 33 or 34 wherein a lower surface portion of the opening on the upstream side of the connecting hole protrudes from an end surface of the partition plate toward the upstream side.

37. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 36 wherein a corner portion of an upper surface of a protruding portion is obliquely cut.

38. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 36 wherein an upper surface of a protruding portion is slanted downward from the upstream side toward the downstream side.

39. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 33 or 34 wherein the connecting hole is slanted downward from the upstream side toward the downstream side.

40. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 38 wherein an angle of slant is greater than an angle of repose of the raw material fines.

41. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 33 wherein a lower surface portion of the opening on the downstream side of the connecting hole protrudes from an end surface of the partition plate toward the downstream side.

42. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 41 wherein a corner portion of an upper surface of a protruding portion is obliquely cut.

43. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 33 wherein the connecting hole protrudes from both end surfaces of the partition plate on the upstream and downstream sides.

44. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 33 wherein one or more gas injecting nozzles are provided in a middle portion of the connecting hole, and a reaction gas is injected from the gas injecting nozzle into the connecting hole.

45. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 44 wherein a porous material is used as a tip of the gas injecting nozzle.

46. (Previously Presented) The multi-partitioned fluidized bed reactor of Claim 44 wherein a tip of the gas injecting nozzle is obliquely bent from the upstream side toward the downstream side.

47. (Previously Presented) The multi-partitioned fluidized bed reactor of claim 35, wherein the connecting hole is slanted downward from the upstream side toward the downstream side.

48. (Previously Presented) The multi-partitioned fluidized bed reactor of claim 39, wherein an angle of slant is greater than an angle of repose of the raw material fines.